

U.S. Serial No. 10/731,777  
Amendment Dated February 17, 2005  
Response To Office Action Dated October 21, 2004

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### REMARKS

The pending application was filed on December 9, 2003 with claims 1-31. The Examiner issued a restriction requirement dated September 2, 2004 in which claims 1-24 were identified as being directed to a first specie and claim 25-31 were identified as being directed to a second specie. A response was filed by the undersigned representative on October 4, 2004 in which claims 1-24 were elected with traverse on the ground that the embodiment described in paragraph 2, page 3 and corresponding claim 1 is generic, and claims 25-31 are directed to a specie of that genus. The Examiner issued a Non-Final Office Action (hereinafter "the Action") dated October 21, 2004 in which claims 1-31 was indicated as pending, claims 25-31 were withdrawn from consideration, and claims 1-24 were rejected. In particular, the Examiner rejected claims 1, 2, 6-10, 12, 13, 17, 19-21, 23, and 24 under 35 U.S.C. § 102(b) as being anticipated by United States Patent No. 3,744,741 *Christian et al.*, and rejected claims 1-10, 12-21, 23, and 24 under 35 U.S.C. § 102(b) as being anticipated by United States Patent No. 4,485,991 to *Fuller*. The Examiner also rejected claims 11 and 22 as being unpatentable over *Fuller* or *Christian et al.* in view of United States Patent No. 2,783,955 to *Fitzpatrick*.

Claims 1-24 are pending in the patent application and claims 32-33 have been added. Claims 1, 4-6, 12, and 15-17 have been amended, and claims 7, 8, 18, 19, and 25-31 have been canceled without prejudice. In view of the arguments below, claims 1-6, 9-17, 20-24,

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and 32-33 are allowable, and the Examiner is respectfully requested to withdraw the rejections and issue a Notice of Allowance.

## **I. AMENDMENT TO SPECIFICATION**

We have recently learned that the pending application is directed to an invention created with financial assistance of a federal grant. Thus, the specification has been amended to reflect this fact, as required by 35 U.S.C. 202(c)(6) and discussed at MPEP 310, 300-12.

## **II. REJECTION OF CLAIMS 1, 2, 6-10, 12, 13, 17, 19-21, 23, AND 24 UNDER 35 U.S.C. §102(b)**

The Examiner rejected claims 1, 2, 6-10, 12, 13, 17, 19-21, 23, and 24 under 35 U.S.C. § 102(b) as being anticipated by United States Patent No. 3,744,741 *Christian et al.* The Examiner argued that, regarding claims 1 and 12, *Christian* discloses a wing for a MAV having at least one layer of resilient material having a camber forming a concave surface facing downward, wherein the wing is bendable from a steady state position in a first direction such that tips of the wing may be bent toward the concave surface but not substantially in a second direction that is generally opposite to the first direction, and the wing is capable of returning to the steady state position by releasing the tips of the wing. The Examiner further argued, regarding claims 2, 6-10, 13, 17-21, 23, and 24, that *Christian* "disclose[s] every aspect and limitation in these claims."

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Claims 7, 8, 18, and 19 have been canceled without prejudice. Independent claims 1 and 12 have been amended to include, in relevant part, "at least one layer of a resilient, flexible material having a camber forming a concave surface facing downward, the material selected for improving wind gust rejection due to adaptive washout as a result of the material flexibly decambering" (emphasis added). The wing claimed in independent claims 1 and 12 are capable of "allow[ing] a micro air vehicle to fly more smoothly than conventional rigid wing designs in smooth and gusty wind conditions." See Specification, page 10, lines 4-5. The adaptive washout characteristic of the wing enables the wing to change the angle of attack when hit with a wind gust, thereby enabling the wing to fly more smoothly. In particular, the adaptive washout feature allows the angle of attack of the wing to be reduced when a wind gust is encountered, thereby enabling the wing to maintain the same level of flight. Without the adaptive washout feature, a wing that encounters a wind gust, such as the monolithic, spring steel wing disclosed in *Christian*, experiences an increase in lift on the pressure side of the wing that causes the wing to rise quickly in the air. Thus, for at least this reason, independent claims 1 and 12 are allowable, and the Examiner is respectfully requested to withdraw the rejection and issue a notice of allowance.

The Examiner stated that *Christian* discloses "every aspect" of claims 2, 6-10, 13, 17-21, 23, and 24; however, the undersigned representative respectfully disagrees. Claims 2 and 13 state "wherein the at least one layer of a resilient material comprises a leading edge formed from a first material that is different from the material forming a remainder of the at

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least one layer." In contrast, *Christian* discloses a wing that is "[p]referably . . . stamped or roll-formed using a suitable flexible and resilient material." *Christian*, column 3, lines 5-7. *Christian* does not mention use of more than a single material to form a wing. Furthermore, *Christian* does not disclose a "leading edge formed from a first material that is different from the material forming a remainder of the at least one layer," as claimed in claims 2 and 13. The claimed leading edge provides additional stability to the wing while enabling adaptive washout to occur by permitting adaptive washout as a result of the material flexibly decambering. The *Christian* wing would not be capable of adaptive washout. Thus, for at least this reason, claims 2 and 13 are allowable.

As regarding claims 9 and 20, which state "a wing span of the wing is between about three inches and about twenty four inches," *Christian* does not disclose that the wing disclosed in *Christian* may be between about three inches and about twenty four inches. Thus, for at least this reason, claims 9 and 20 are allowable.

As regarding claim 23, which states "a tail coupled to the central body that is generally orthogonal to the wing," *Christian* discloses a curved tail attached to a body. However, no portion of the tail disclosed in *Christian* is generally orthogonal to the wing. Thus for at least this reason, claim 23 is allowable.

Furthermore, claims 2, 6, 9, 10, 13, 17, 20, 21, 23, and 24 are allowable because these claims depend from allowable independent claims 1 and 12. Thus, for at least this reason,

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and the reasons previously stated, claims 2, 6, 9, 10, 13, 17, 20, 21, 23, and 24 are allowable as originally filed.

### III. REJECTION OF CLAIMS 1-10, 12-21, 23, AND 24 UNDER 35 U.S.C. §102(b)

The Examiner rejected claims 1-10, 12-21, 23, and 24 under 35 U.S.C. § 102(b) as being anticipated by United States Patent No. 4,485,991 to *Fuller*. The Examiner argued that, regarding claims 1 and 12, *Fuller* discloses a wing for a MAV in figures 1 and 6 having at least one layer of resilient material having a camber forming a concave surface facing downward, wherein the wing is bendable from a steady state position in a first direction such that tips of the wing may be bent towards the concave surface but not substantially in a second direction that is generally opposite to the first direction, and the wing is capable of returning to the steady state position by releasing the tips of the wing. The Examiner argued, regarding claims 2, 6-10, 13, 17-21, 23, and 24, that *Fuller* "disclose[s] every aspect and limitation in these claims." In addition, the Examiner rejected claims 3, 4, 5, 14, 15, and 16 stating that it is known to use these mixtures of materials for the airfoil and resilient materials, as discussed at column 2, lines 50-61 and column 4, lines 28-36. The Examiner also stated that *Fuller* discloses a tail coupled to the central body that is generally orthogonal to the wing and generally vertical to the wing.

As previously discussed, independent claims 1 and 12 have been amended to include, in relevant part, "at least one layer of a resilient, flexible material having a camber forming a

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concave surface facing downward, the material selected for improving wind gust rejection due to adaptive washout as a result of the material flexibly decambering" (emphasis added).

The wing claimed in independent claims 1 and 12 is capable of "allow[ing] a micro air vehicle to fly more smoothly than conventional rigid wing designs in smooth and gusty wind conditions." See Specification, page 10, lines 4-5. The adaptive washout characteristic of the wing enables the wing to absorb turbulence without resulting in rough air travel. In stark contrast, the wing disclosed in *Fuller* does not provide for adaptive washout of the wing in turbulent air conditions. Thus, for at least this reason, independent claims 1 and 12 are allowable, and the Examiner is respectfully requested to withdraw the rejection and issue a notice of allowance.

As regarding claims 2 and 13, which state "the at least one layer of a resilient material comprises a leading edge formed from a first material that is different from the material forming a remainder of the at least one layer" and claims 3 and 14, *Fuller* does not disclose a leading edge formed from a different material than the remainder of the layer of resilient material. Rather, *Fuller* discloses an upper skin (11) and a lower skin (12) separated by an expanded plastic (14) positioned between the two layers, as shown in Figure 2 and discussed at column 2, lines 8 and 11-14. *Fuller* does not disclose a leading edge formed from a material that is different from the material forming the remainder of the layer. For at least this reason, claims 2, 3, 13, and 14 are allowable.

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As regarding claims 9 and 20, which state "a wing span of the wing is between about three inches and about twenty four inches," *Fuller* does not disclose that the wing disclosed in *Fuller* may be between about three inches and about twenty four inches. Thus, for at least this reason, claims 9 and 20 are allowable.

Furthermore, claims 2, 6, 9, 10, 13, 17, 20, 21, 23, and 24 are allowable because these claims depend from allowable independent claims 1 and 12. Thus, for at least this reason, and the reasons previously stated, claims 2, 6-10, 13, 17-21, 23, and 24 are allowable as originally filed.

#### IV. REJECTION OF CLAIMS 11 AND 22 UNDER 35 U.S.C. § 103(a)

The Examiner rejected claims 11 and 22 under 35 U.S.C. § 103(a) as being unpatentable over *Fuller* or *Christian* in view of United States Patent No. 2,783,955 to *Fitzpatrick*. The Examiner admitted that *Fuller* and *Christian et al.* do not disclose a riser section forming a concave portion on an upper surface of the wing proximate to a trailing edge of the wing. However, the Examiner argued that *Fitzpatrick* discloses a riser section forming a concave portion on an upper surface of the wing proximate to a trailing edge of the wing as taught by concave portions of wing (34). The Examiner concluded that it would have been obvious at the time of the invention for one of ordinary skill in the art to include the teachings in *Fitzpatrick* with either *Fuller* or *Christian* for the purpose of increasing maneuverability and lift.

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Claims 11 and 22 claim "a riser section forming a concave portion on an upper surface of the wing proximate to a trailing edge of the wing for controlling flight of a micro air vehicle." The riser forms a concave portion on an upper surface of the wing for neutralizing a pitching moment developed during flight of a micro air vehicle with the claimed wing. The riser eliminates the need for a horizontal tail member thereby facilitating easier storage of a micro air vehicle. The riser section on the wing may deform with the remainder of the wing when tips of the wing may be bent toward the concave surface of the wing.

In stark contrast, *Christian* and *Fuller* do not disclose a wing, as shown in Figure 1, with a riser section, as the Examiner admitted at on page 4 of the Action. Furthermore, *Fitzpatrick* discloses an air, land, and water craft having two mechanically operated wings attached to a fuselage. The Examiner cites *Fitzpatrick* for disclosing a concave surface proximate to a trailing edge of the wing. However, *Fitzpatrick* does not include any discussion of a concave surface proximate to the trailing edge, nor do the figures show a concave surface proximate to the trailing edge. Rather, a mechanically movable wing structure is disclosed. Furthermore, the invention disclosed in *Fitzpatrick* is directed to a craft for human air travel and thus, is not directed to a micro air vehicle. Thus, for at least these reasons, *Fitzpatrick* does not anticipate or render obvious, when combined with *Christian* and *Fuller*, the claimed "concave surface proximate to the trailing edge." Therefore, claims 11 and 22, respectively, are allowable, and the Examiner is respectfully requested to withdraw the rejection and issue a Notice of Allowance.

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## **V. NEW CLAIMS**

New claims 32-33 have been added and are directed to a wing for a micro air vehicle wherein the material forming a remainder of the at least one layer forming the wing is formed from a latex. The flexible properties of the latex improve the wing, and more specifically, improve the wind gust rejection characteristic of the wing due to adaptive washout as a result of the material flexibly decambering. Such material and characteristics, in combination with the remainder of claimed elements, are not disclosed in the cited references.

## **VI. PETITION FOR ONE MONTH EXTENSION OF TIME**

This is a Petition for a One Month Extension of Time pursuant to 37 CFR § 1.136. Please charge the fee in the amount of \$60.00 for a one (1) month extension of time pursuant to 37 CFR § 1.17(a)(1) and charge any underpayment or credit any overpayment to Deposit Account No. 50-0951. A duplicate copy of this communication is enclosed.

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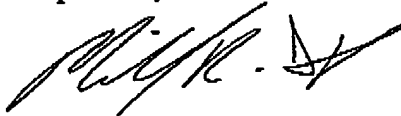
### CONCLUSION

For at least the reasons given above, claims 1-6, 9-17, 20-24, and 32-33 define patentable subject matter and are thus allowable. The undersigned representative thanks the Examiner for examining this application.

Should the Examiner believe that anything further is necessary in order to place the application in better condition for allowance, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

No fees in addition to the one-month extension of time fee are believed due; however, the Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, to Deposit Account No. 50-0951.

Respectfully submitted,



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